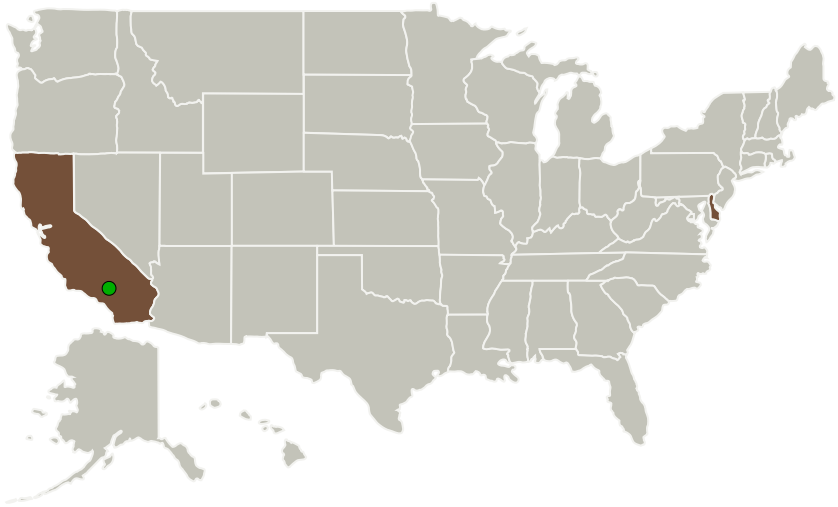
A Novel Laser Ultrasound Visualization Tool for Non-destructive Evaluation of Composite Aircraft Structures, Phase I

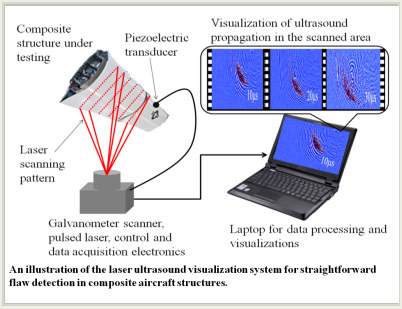
Completed Technology Project (2015 - 2015)

Project Introduction

In this proposal, AlphaSense details the development of a novel laser ultrasound visualization system non-destructive evaluations of composite aircraft structures. The key innovations of this proposal include the following: a) Defect detection and identifications based on direct visualizations of the ultrasound propagation characteristics in the testing articles, b) The application of laser generated ultrasound signals for damage detection and structural integrity evaluations, and c) The implementation of a fully integrated and self-contained portable sensor system. With such innovations, the merits of the proposed sensor and its advantages over other techniques are listed below: a) Compact, lightweight, and portable, b) Capable of detecting a wide variety of defects, c) Compatible with complex shapes and configurations, d) High sensitivity and good spatial resolution, e) High measurement throughput, and f) Easy and safe to the operators.

Primary U.S. Work Locations and Key Partners





An illustration of the laser ultrasound visualization system for straightforward flaw detection in composite aircraft structures.

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Table of Contents

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
AlphaSense, Inc.	Lead Organization	Industry Women-Owned Small Business (WOSB)	Wilmington, Delaware
Armstrong Flight Research Center(AFRC)	Supporting Organization	NASA Center	Edwards, California

Primary U.S. Work Locations	
California	Delaware

Project Transitions

July 2015: Project Start

December 2015: Closed out

Closeout Summary: A Novel Laser Ultrasound Visualization Tool for Non-destructive Evaluation of Composite Aircraft Structures, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/138746)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

AlphaSense, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

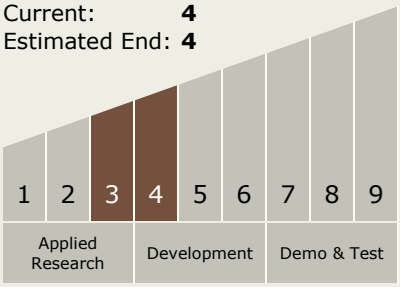
Carlos Torrez

Principal Investigator:

Pengcheng Lv

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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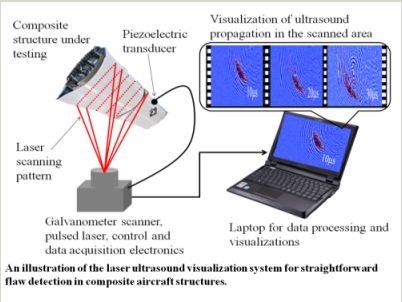
Images



Briefing Chart Image
A Novel Laser Ultrasound Visualization Tool for Non-destructive Evaluation of Composite Aircraft Structures, Phase I *(https://techport.nasa.gov/image/131740)*

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.3 In-Situ Instruments and Sensors
    - TX08.3.4 Environment Sensors

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System